

HABITAT MITIGATION AND MONITORING PLAN

**BEACH MARSH INVASIVE NONNATIVE REMOVAL
AND SALT MARSH RESTORATION FOR THE BOLSA CHICA
EMERGENCY ROADWAY EMBANKMENT REPAIR PROJECT**

ORANGE COUNTY

EA 060100

LSA

April 2010

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AND SALT MARSH RESTORATION FOR THE BOLSA CHICA
EMERGENCY ROADWAY EMBANKMENT REPAIR PROJECT**

ORANGE COUNTY

EA 0K0100

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LSA

April 2010

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A: Plant Species Currently Present within the Proposed Restoration Area

EXECUTIVE SUMMARY

This Habitat Mitigation and Monitoring Plan (HMMP), prepared for the California Department of Transportation (Caltrans), provides the concepts and direction for implementation and maintenance of the mitigation required to compensate for impacts to jurisdictional areas associated with the emergency embankment reconstruction work for the State Route 1 (SR-1; Pacific Coast Highway [PCH])/Bolsa Chica Roadway Embankment Reconstruction project. This HMMP is based on the conceptual HMMP prepared by LSA Associates, Inc. (LSA) and dated August 20, 2009.

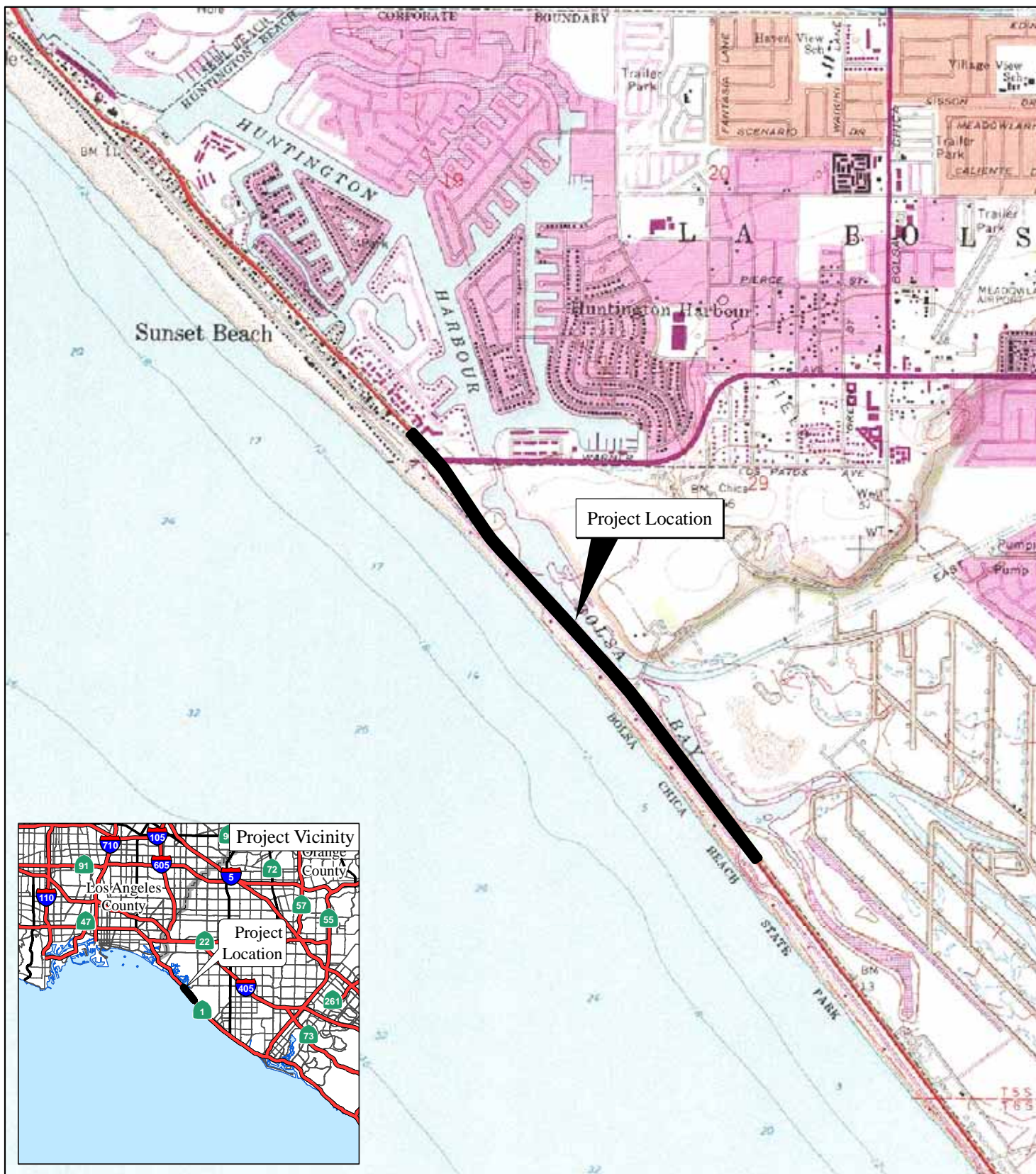
The SR-1 (PCH)/Bolsa Chica Roadway Embankment Reconstruction project site is located in the City of Huntington Beach, Orange County, California (Figure 1), and is found on the United States Geological Survey (USGS) *Seal Beach, California* 7.5-minute topographic map, Section 29, Township 5 South, Range 11 West. Due to the limited amount of roadway shoulder available and lack of on-site planting opportunities, mitigation will take place off site. The Beach Marsh invasive nonnative removal and salt marsh restoration site is located in the City of Huntington Beach, Orange County, California (Figure 2), and is found on the USGS *Newport Beach* 7.5-minute topographic map, Section 13, Township 6 South, Range 11 West. A Coastal Development Permit hearing was held on February 24, 2010, for mitigation at the Beach Marsh and was approved.

This HMMP is required and directed by United States Army Corps of Engineers (Corps) Regional General Permit No. 63 (RGP 63) (File # SPL-2009-00531-SCH), United States Fish and Wildlife Service (USFWS) Informal Section 7 Consultation FWS-OR-09B0048-09F1004, and California Coastal Commission (CCC) Emergency Permit 5-09-131-G. The Regional Water Quality Control Board (RWQCB) water quality certification was covered by the Corps permit pursuant to Section 401 of the Clean Water Act (CWA).

As reported in the Biological Construction Monitoring and Impact Assessment Report (LSA, August 20, 2009), initial project activities resulted in permanent impacts to a total of 0.002 acre (ac) of potential Corps deepwater aquatic habitat. This is approximately 0.018 ac less than the total proposed impacts to Corps jurisdiction. No permanent impacts to potential Corps wetland waters of the United States or temporary impacts to potential Corps jurisdiction occurred as a result of project activities. A total of 0.069 ac of potential CCC wetland jurisdiction was permanently affected by project activities. This area includes the Corps impacts described above and is approximately 0.031 ac less than the total proposed impacts to potential CCC jurisdiction. No temporary impacts to potential CCC wetland jurisdiction occurred as a result of these project activities. A mitigation ratio of 4:1 was proposed to compensate for these impacts to areas potentially subject to the jurisdiction of the Corps and CCC, for a total of 0.276 ac of habitat creation, restoration, or enhancement.

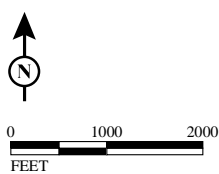
Subsequent to the issuance of the Biological Construction Monitoring and Impact Assessment Report, additional impacts were identified. The additional impacts include the placement of a temporary k-rail barrier in order to protect bicyclists and pedestrians. This temporary k-rail will ultimately be removed and replaced with a metal beam guardrail.

A total of 0.117 ac of potential CCC jurisdiction will be permanently impacted by project activities. This area includes impacts to 0.002 ac of potential Corps jurisdiction. In addition, 0.005 ac of potential CCC jurisdiction will be temporarily impacted by project activities. No temporary impacts to potential Corps jurisdiction will occur. At a mitigation ratio of 4:1, 0.468 ac of habitat creation, restoration, or enhancement would be required to compensate for permanent project impacts.



LSA

FIGURE 1



LEGEND

— Project Location

SR-1 Bolsa Chica Roadway Embankment
Reconstruction Project

Project Location Map

12-ORA-1 PM 28.7/29.7

EA 0K0100

SOURCE: USGS 7.5' QUAD - SEAL BEACH (81); CALIF.

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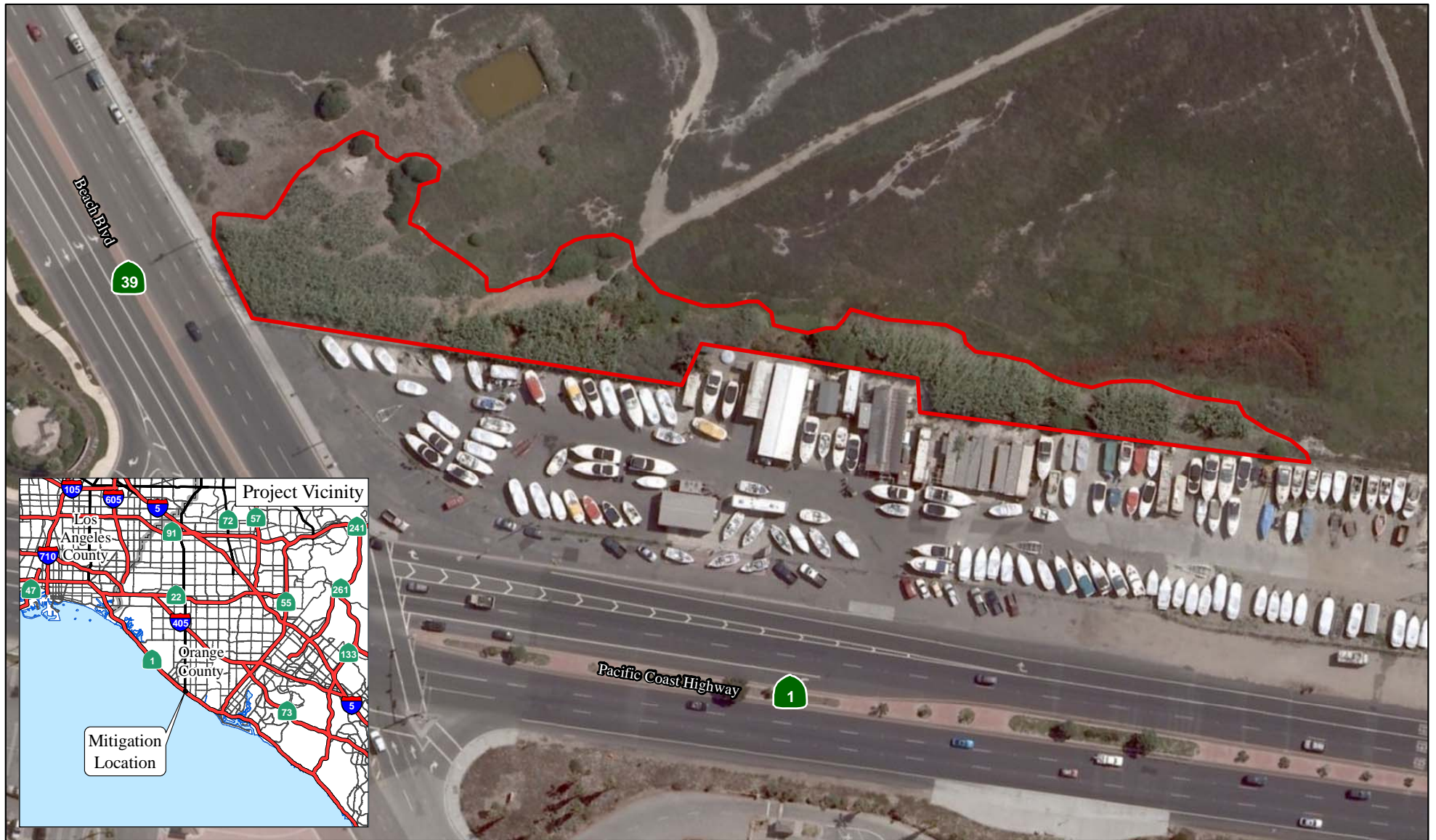
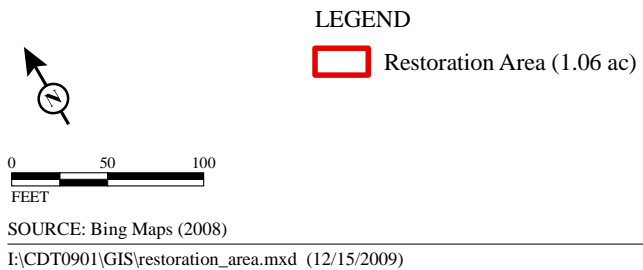


FIGURE 2



*SR-1/ Beach Blvd Invasive Nonnative
Removal and Salt Marsh Restoration*

Mitigation Location Map

12-ORA-1 PM 28.7/29.7
EA 0K0100

Impacts will be mitigated through the removal of invasive nonnative vegetation, primarily giant reed (*Arundo donax*), at the Caltrans-owned Beach Boulevard/PCH parcel. The total acreage of nonnative vegetation to be removed is approximately 1.06 ac. Invasive nonnative vegetation will be removed through a combination of mechanical removal and application of an agency-approved herbicide. The site will be installed with a native plant palette soon after the initial removal of nonnative vegetation. Mitigation success will be assessed through performance standards specific to the site for the establishment of seeded and planted species and the exclusion of exotic and ruderal species. Total monitoring requirements will be for an anticipated 5 years or until performance standards are met. As-built, annual, and final monitoring and maintenance reports will be provided. Based on anticipated mitigation ratios, the total mitigation area would be higher than that required for the project.

This HMMP describes the site preparation, seed and plant material, installation methods, and maintenance and monitoring required until the performance standards are met.

PROJECT INFORMATION

Project Name

Bolsa Chica Emergency Roadway Embankment Repair Project

Applicant

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Permit File Numbers

Corps Permit: RGP 63 (File # SPL-2009-00531-SCH)
 USFWS Informal Section 7 Consultation: FWS-OR-09B0048-09F1004
 CCC: Emergency Permit 5-09-131-G
 CRWQCB Certification: Covered by Corps Permit

Acreage of Impacts to Individual Habitat Types

Permanent.

- Corps jurisdictional areas: 0.002 ac of potential Corps deepwater aquatic
- CCC jurisdictional areas: 0.002 ac of potential CCC deepwater aquatic habitat and 0.115 ac of potential CCC wetlands

Temporary.

- CCC jurisdictional areas: 0.005 ac of potential CCC wetlands

Construction Timeline

- Project construction occurred between July 27, 2009, and August 7, 2009.
- The temporary k-rail was installed on August 21, 2009.

OBJECTIVES/MITIGATION GOALS

Resource Types, Acreage, and Methods of Compensation

- Approximately 1.06 ac of invasive nonnative removal and salt marsh revegetation

Table A summarizes the requirements upon which compliance will be judged.

Table A: Summary of Performance Standards

Success Criteria	Meet by Year 5	Year 1 Goal	Year 2 Goal	Year 3 Goal	Year 4 Goal	Year 5 Goal
Relative cover by native salt marsh plant components	≥ 80%	20%	30%	50%	70%	80%
Cover by nonnative weeds	< 10%	30%	20%	15%	10%	< 10%
Cover by nonnative herbaceous invasive weeds	< 5%	20%	15%	10%	5%	< 5%
Cover by nonnative perennial invasive weeds	0%	10%	5%	5%	0%	0%

Resource Functions of the Mitigation

The removal of invasive nonnative species and restoration of native salt marsh habitat will contribute to the overall effort of improving the Beach Marsh wetland. Removal of invasive nonnative species and restoration of native habitat will recreate historical wetlands vegetation, thus reestablishing wildlife habitat and water quality functions.

SITE SELECTION

The mitigation site was selected through consultation with resource agencies and landowners, and based on hydrology, soil type, existing vegetation, quality of adjacent habitat, and land ownership. The native salt marsh habitat adjacent to the proposed mitigation site is presently free of giant reed. The removal of giant reed and other invasive species from the proposed mitigation site and restoration of the site to native salt marsh habitat will serve to protect the larger native salt marsh habitat adjacent to the mitigation site from invasion by giant reed and subsequent degradation of the habitat. The topography and elevation of the proposed mitigation site is approximately higher than the adjacent native salt marsh habitat. Removal of the giant reed and its rhizomous roots will likely lower the elevation of the mitigation site slightly, which will serve to move the ground level closer to the water table.

BASELINE INFORMATION

The approximately 1.06 ac invasive nonnative species removal/salt marsh restoration area is located northeast of the intersection of PCH and Beach Boulevard. The restoration area is currently dominated by invasive nonnative species, including giant reed, castor bean (*Ricinus communis*), and Brazilian pepper (*Schinus terebinthifolius*). Native species observed on site include salt grass (*Distichlis spicata*), alkali heath (*Frankenia salina*), and common woody pickleweed (*Salicornia virginica*). A complete list of species observed on site is presented in Appendix A. The restoration area is a relatively narrow strip of land between a former parking lot and a salt marsh dominated by native species.

MITIGATION WORK PLAN

The following specifications shall be adhered to during all phases of the restoration project under the direction of the Caltrans-designated representative and the Caltrans-designated Monitoring Biologist.

Scope of Work

With the exception of the seed and plant material, all labor and materials (including water) necessary to complete the work indicated below will be furnished by the Restoration Contractor. This work includes, but is not limited to, the following:

- Remove all nonnative invasive species within the restoration area.
- Install, maintain, and provide plant establishment throughout the duration of the restoration contract any erosion control measures (if necessary) that may be installed within the restoration areas.
- If necessary, install, maintain throughout the duration of the restoration contract, and remove the temporary irrigation system.
- Perform grow/kill (weed germination) cycles.
- Install stakes and flags delineating the restoration area.
- Install 650 container plants within the restoration area.
- Guarantee a 100 percent survival rate of the installed container plants during the first 120 days of the plant establishment period.
- Hydroseed 40.03 pounds (lbs) of seed within the restoration area.
- Maintain the restoration area for 5 years or until the performance standards are achieved.

PROJECT SCHEDULE

Work will adhere to the following schedule:

- Removal of all nonnative invasive species shall be completed prior to fine grading.
- All erosion control measures and the irrigation system shall be installed, if necessary, after completion of the initial removal of invasive nonnative species and prior to seed and plant installation.
- Grow/kill (weed germination) cycles shall be implemented following the initial removal of invasive nonnative species and prior to installation of the planned plant palette.
- Container plant installation shall be completed following completion of the grow/kill cycles.
- Seed will be applied via the hydroseed method as a last order of work.
- The Restoration Contractor must guarantee a 100 percent survival rate of the 650 container plants within the restoration area throughout the first 120 days of the plant establishment period.
- The Restoration Contractor shall maintain the restoration area until the performance standards are achieved (estimated to be 5 years).
- Annual reports shall be prepared by the Monitoring Biologist.
- If installed, the temporary irrigation system within the restoration area shall be removed once the performance standards have been achieved or at the discretion of the Monitoring Biologist.

SITE PREPARATION

Nonnative Invasive Species Removal and Fine Grading

Site preparation will entail the removal of all nonnative invasive species on site. The following site preparation activities will be required for the restoration site:

- Giant reed and other invasive woody nonnative species (e.g., castor bean and Brazilian pepper) will be removed mechanically, except in cases where mechanical removal is ineffective or harmful to adjacent native habitat.
- Rhizome mats that are not picked up by a grappling bucket shall be removed by hand.
- In cases where it is necessary to remove invasive woody nonnative species by other than mechanical means (i.e., in areas adjacent to high-quality native habitat), these species will be cut to approximately 6 inches in height and immediately treated with herbicide (see Herbicide Treatment Guidelines below).
- All nonnative vegetation removed from the restoration area during site preparation shall be stacked in a large pile well outside of the restoration area and existing wetland areas (20 ft) and chipped. The chipped material will then be loaded onto a truck and taken to the nearest landfill or green waste recycling facility.
- If necessary, fine grading and soil decompaction of the site shall immediately follow initial removal of the nonnative invasive species.

Erosion Control

Given the current and the anticipated topography on site, no erosion control measures are anticipated; however, if erosion control measures are deemed necessary by the Monitoring Biologist, they shall be installed according to the following specifications. In the case of heavy rainfall conditions, nonvegetative erosion control measures (e.g., sandbags, rice straw wattles) may need to be installed within the restoration area. Only straw wattles are to be used within the restoration area. Erosion control measures shall be installed following the completion of fine grading and before the installation of the planned native plant community.

The Restoration Contractor shall be responsible for all erosion control for the entire term of the contract. Erosion control may include, but not be limited to: (1) continuation of nonvegetative erosion control, as necessary; and (2) repair of damaged plants, rutting, and washouts. The Restoration Contractor is responsible for the success of the restored plant community; therefore, it is to the Restoration Contractor's advantage to use as many erosion control measures as necessary to prevent erosion damage. This will include repair of any significant erosion within the restoration area. All rice straw wattles will be installed along slope contours in accordance with the manufacturer's specifications. All rice straw wattles shall be manufactured from straw that is wrapped in biodegradable, natural fiber netting a minimum of 8 inches in diameter.

Temporary Irrigation

Given the current and anticipated hydrology within the restoration area, an irrigation system may be required. If an irrigation system is deemed necessary by the Monitoring Biologist, it shall be installed according to the following specifications. To expedite the growth of nonnative vegetation during the grow/kill cycles, prevent loss of the plantings during periods of dry conditions, and help establish the newly installed vegetation community, a temporary irrigation system (subject to approval by the Monitoring Biologist) may be installed within the restoration area by the Restoration Contractor. Established native vegetation communities do not require irrigation under normal conditions, so supplemental irrigation will be applied sparingly and used primarily to establish the native plant community. The Restoration Contractor shall be responsible for inspection and maintenance of the irrigation system. All water used for irrigation shall be free of impurities, excess chlorine, and salts. The irrigation system shall be removed by the Restoration Contractor once the performance standards have been achieved or at the discretion of the Monitoring Biologist.

Grow/Kill Program

Following installation of the irrigation system (if necessary), “grow/kill” cycles shall be performed by the Restoration Contractor. The Monitoring Biologist will determine the commencement and completion deadlines for grow/kill cycles throughout the year.

“Grow/kill” is a process of exhausting the seed bank in the soil by promoting the growth of plants (through irrigation if rainfall is not sufficient) and then killing the seedlings with herbicide before they set seed. This method will also serve to stimulate growth of invasive nonnative species from root or rhizome fragments that remain in the soil. Unless there is adequate natural rainfall (as determined by the Monitoring Biologist), the Restoration Contractor shall begin a grow/kill cycle by irrigating the entire restoration site. The site shall be irrigated with sufficient water to initiate and promote vegetative growth. Excess irrigation runoff shall not be allowed, and the Restoration Contractor shall be responsible for the source and expense of the water needed for this task. Once the vegetative growth reaches a height of approximately 3 inches, all vegetation on the restoration site shall be herbicide-treated in accordance with the Herbicide Treatment Guidelines below. Any plants that germinate within the restoration area during this phase shall be removed before they produce flowers, set seed, or reach a height of 6 inches, whichever occurs first. Following each grow/kill cycle, all of the thatch will be removed and legally disposed of off site. Grow/kill cycles will be conducted continuously until installation of the native plant palette.

The Monitoring Biologist will visit the areas periodically to determine when grow/kill events should occur and will notify the Restoration Contractor when irrigation or herbicide treatment are necessary. Timing is crucial in the implementation of grow/kill cycles; thus, upon receiving notification, the Restoration Contractor will have 5 working days to complete each individual task (i.e., initiate irrigation, treat with herbicide, remove thatch). Although the Monitoring Biologist will make recommendations regarding the timing of herbicide application and irrigation, throughout this period it will be the responsibility of the Restoration Contractor to monitor the progress of the weeds on site and to remove or spray weeds before they set seed.

RESTORATION MATERIALS

All materials used for this restoration plan are subject to approval by the Monitoring Biologist. Although it is not a stated goal of the mitigation or the restoration plan, the species chosen and their quantities to be included within the container plant and seed list reflect a desire to create salt marsh habitat that is attractive to the Belding's savannah sparrow (*Passerculus sandwichensis*).

Container Plants

Container plants shall be installed throughout the approximately 1.06 ac of the restoration area. The list of container plants to be installed within the restoration area is presented in Table B. All container plants that have mycorrhizal associations shall be inoculated with mycorrhizal fungi at the nursery.

Table B: Container Plant Lists

Scientific Name	Common Name	Container Size	Number of Plants Required
<i>Encelia californica</i>	California encelia	1 gal	50
<i>Frankenia salina</i>	Alkali heath	plugs	300
<i>Salicornia virginica</i>	Common woody pickleweed	plugs	300
Total			650

gal = gallon

The genetic source of all container plants will be within 20 miles (mi) of the project site, if possible, and of similar microclimatic regime. All plant substitution decisions or alternative genetic sources shall be approved by the Monitoring Biologist.

A representative sample of all container plants must be inspected and approved by the Monitoring Biologist at the time of delivery. All plants shall be healthy, be in good condition, and have a good root-to-shoot ratio (approximately 2:1). The roots shall be young roots that fill the container and must not be wrapped around the sides of the containers. Any plants that, in the opinion of the Monitoring Biologist, are incapable of surviving for 120 days following good installation techniques will be returned to the nursery to be either replaced or regrown for installation during the following growing season.

Delivery of the container plants for the restoration area may be requested at least 2 weeks prior to the scheduled planting time. Upon receipt, the container plants shall be stored in such a way that the natural elements (e.g., dryness, heat, excessive wind) will not hinder their growth or kill the plants prior to installation. All container plants shall be installed within 3 days following acceptable delivery. All container plants shall be maintained at a 100 percent survival rate throughout the first 120 days, an 80 percent survival rate after the first year, and a 100 percent survival rate thereafter.

Seed

All of the approximately 1.06 ac restoration area will be hydroseeded. The species to be included for the restoration area (Table C) were selected based on the native species found within the

immediate area. The amount of seed required was based upon the pure live seed, percent purity, and percent germination numbers available at the time this HMMP was written.

Table C: Restoration Seed List

Scientific Name	Common Name	lbs/acre	lbs required
<i>Ambrosia psilostachya</i>	Western ragweed	2.00	2.12
<i>Baccharis emoryi</i>	Emory's baccharis	1.50	1.59
<i>Camissonia cheiranthifolia</i>	Beach evening primrose	0.25	0.27
<i>Distichlis spicata</i>	Salt grass	3.00	3.18
<i>Encelia californica</i>	California encelia	2.00	2.12
<i>Frankenian salina</i>	Alkali heath	7.00	7.42
<i>Heliotropium curassavicum</i>	Alkali heliotrope	4.00	4.24
<i>Isocoma menziesii</i>	Coastal goldenbush	2.00	2.12
<i>Leymus condensatus</i>	Giant wild-rye	2.00	2.12
<i>Leymus triticoides</i>	Beardless wild-rye	2.00	2.12
<i>Muhlenbergia rigens</i>	California deergrass	0.50	0.53
<i>Pluchea odorata</i>	Marsh-fleabane	0.25	0.27
<i>Salicornia virginica</i>	Common woody pickleweed	10.00	10.60
<i>Scirpus robustus</i>	Seacoast bul-rush	1.00	1.06
<i>Typha latifolia</i>	Broad-leaved cat-tail	0.25	0.27
Total		37.75	40.03

lbs/acre = pounds of pure live seed per acre

Prior to ordering the seed, the Monitoring Biologist shall obtain updated pure live seed, percent purity, and percent germination numbers from the seed supplier and make any needed adjustments.

All seed shall be custom collected and must be collected from areas within a 20 mi radius of the project site and from a similar microclimatic regime, if available. All plants will be from nursery stock propagated from seeds and cuttings collected in coastal Orange County, as feasible. No planting materials will be obtained from areas outside Los Angeles, Orange, and San Diego Counties, nor farther than 10 mi from the coast. Those species that are only obtainable from commercial sources will be acceptable. All seed substitution decisions or alternative genetic sources shall be approved by the Monitoring Biologist.

Upon receipt, the seed must be stored in a manner that ensures its viability until it is sown. All seed must be sown within 48 hours of being delivered.

Other Materials

All other materials that are not specifically described herein but are required to complete this project shall be provided by the Restoration Contractor and are subject to the approval of the Monitoring Biologist.

INSTALLATION TECHNIQUES

Planting Method

Planting locations for container plants within the restoration area shall be marked under the instruction and supervision of the Monitoring Biologist. Plantings shall be spaced in natural-looking patterns to replicate the character of the nearby native plant communities with consideration of the microclimatic requirements of each species. All container plants shall be planted in accordance with the following specifications (Figure 3):

- All planting holes shall be augered (however, no wheel-mounted augers shall be permitted), have vertical sides with roughened surfaces, and be 1.5 times the diameter and twice the depth of the plant's container.
- After excavation and before planting, the planting holes shall be filled approximately one-half full with water, backfilled with thoroughly broken-up native topsoil, and then completely filled with water to avoid soil settling after installation. Holes shall be allowed to drain thoroughly between fillings to reduce settling.
- Any roots wrapped around the sides of the containers shall be pulled loose from the root balls. The sides of the root balls shall be scarified to promote new root development.
- Roots shall be adequately protected at all times from the sun and/or drying winds.
- Plants shall be planted with the roots untangled and laid out in the planting holes to promote good root growth and prevent the plants from becoming rootbound.
- Plants shall be set in the thoroughly drained planting holes so that the crowns of the root balls are 0.5 inch above finish grade when backfilled with soil. The crowns of the plants shall not be depressed.
- A watering basin 24 inches in diameter shall be created around each plant. In cases where the steepness of the slope is not conducive to a circular planting basin, an ovoid basin shall be constructed that follows the contour of the slope and has an approximate area of 3 square feet. The soil inside and outside the basin shall be at the same level. The berm shall be created above grade. The basin shall not be a depression in the soil.
- Each plant shall be individually watered at the time of planting with sufficient water to reach the lower roots. Special care must be taken to prevent the soil from washing away from the roots and the root crown from being buried with soil. In addition, special care should be taken to avoid excess watering and the formation of erosion rills along slopes.
- All empty plant containers shall be removed from the restoration site and not left on site overnight.

Hydroseeding Technique

The restoration area shall be seeded using a two-stage hydroseed application method. Preventive measures must be taken to avoid damage to container plants (i.e., spraying and covering plants with mulch, breaking stems or branches with hoses). The application procedure is as follows.

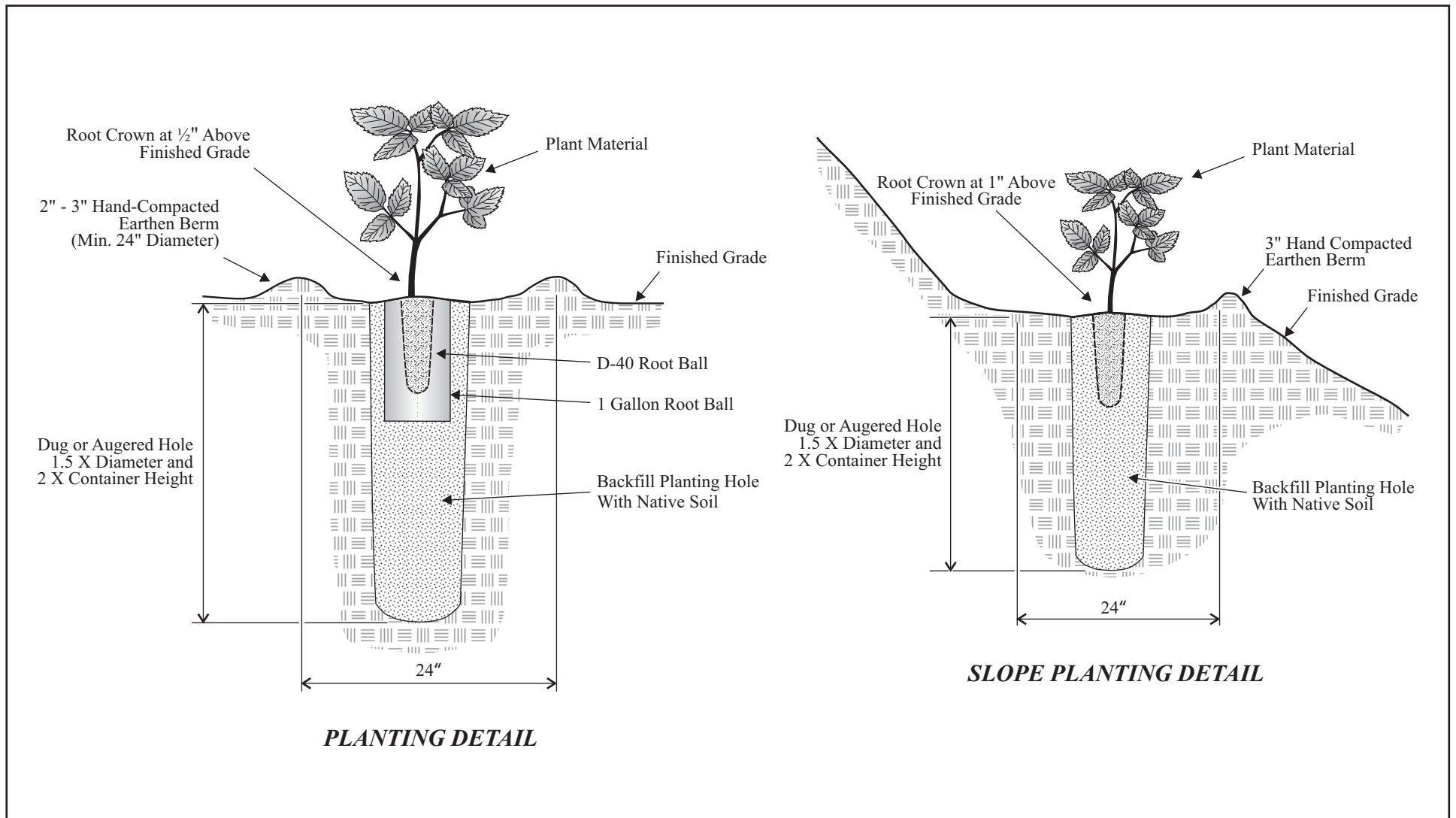


FIGURE 3

*SR-1/Beach Blvd Invasive Nonnative
Removal and Salt Marsh Restoration
Container Planting Detail*

12-ORA-1 PM28.7/29.7
EA OKO100

First Application.

- 150 lbs/ac of 100 percent long-strand wood fiber (no tackifier)
- Specified seed

Second Application.

- 2,000 lbs/ac of 100 percent long-strand wood fiber (no tackifier)
- 150 lbs/ac Ecology Control “M” binder

All hydroseed mixing shall be performed in a clean tank. The tank must be rinsed a minimum of three times in the presence of the Monitoring Biologist. It is the Restoration Contractor’s responsibility to locate a source of clean water and a washout area where rinsing can legally be carried out. The hydroseeder must be equipped with a built-in continuous agitation and recirculation system of sufficient operating capacity to produce homogeneous slurry, and a discharge system that will apply slurry to the designated areas at a continuous and uniform rate.

The slurry preparation shall take place at the project site and shall be started by adding water to the tank while the engine is running at half-throttle. Good recirculation shall be established when the water level has reached the height of the agitator shaft. At this time, the seed shall be added; the long-strand wood fiber shall be added when the tank is at least 30 percent filled with water. The Restoration Contractor shall commence spraying once the tank is full and homogeneous slurry has been created.

The Restoration Contractor shall spray designated areas with the slurry in a sweeping motion and in an arched stream until a uniform coat is achieved, with no slumping or shadowing, as the material is spread at the required rate. The hydroseed slurry should float down from the arched stream, as opposed to being shot directly at the ground. During hydroseeding, the container plants must be protected from damage (including, but not limited to, coating with mulch, damage by direct spray, and dragging hose). Excessive mulch coating on container plants must be removed before the end of the day. The Restoration Contractor shall be required to replace each lost plant at the discretion of the Monitoring Biologist.

The tanks must be emptied completely during each stage of hydroseeding. Any slurry mixture that has not been applied by the Restoration Contractor within 1 hour after mixing shall be rejected and replaced at the Restoration Contractor’s expense. In addition, all cost incurred for repair or replacement of bare, sparse, or damaged areas shall be the sole responsibility of the Restoration Contractor. Following application, all activity on the mulch layer must be kept at a minimum.

RESTORATION MAINTENANCE

Maintenance of the restoration area must be performed in accordance with the following specifications until the performance standards are achieved. Normal maintenance will include weeding, herbivore control, and watering as necessary.

During the first 120 days after the installation is complete, the plant community must be maintained regularly to ensure its successful establishment. At the end of the 120-day plant establishment period, a thorough inspection of the restoration area shall be conducted by the Monitoring Biologist, and a list of those container plants that are dead within the restoration area shall be submitted to the Restoration Contractor. Dead or missing container plants will be replaced. An 80 percent survival rate is required after the first year, and a 100 percent survival rate is required thereafter. The species and planting locations shall be determined by the Monitoring Biologist.

Weed Control

To help establish the developing salt marsh community, nonnative weeds shall be removed from the restoration area to reduce the amount of competition for natural resources, including water, nutrients, and sunlight. The amount of weeding required will be determined by the amount of weed seed in the soil, weather conditions, and the diligence and persistence in removing the weeds before they produce more seed, thereby reducing the weed seed bank. The following weeding guidelines shall be adhered to continuously:

- The percent cover by nonnative weeds must be kept below 10 percent, invasive herbaceous nonnative weeds must be kept below 5 percent, and invasive perennial nonnative weeds must be absent. Invasive species are those listed as having “High” or “Moderate” rates of dispersal and establishment on the California Invasive Plant Inventory.
- No more than 5 percent of the restoration area may be covered at any time by weeds that have reached the seed dispersal stage.

Methods of Removal. With the exception of those weed species that cannot be eradicated through manual removal (e.g., giant reed, castor bean, and Brazilian pepper), weeds present shall be removed manually. Herbicide is only permitted within the restoration area with the written authorization of the Monitoring Biologist (see Herbicide Treatment Guidelines section). No weed whipping or string-line trimmers shall be permitted within the restoration area without the written authorization of the Monitoring Biologist. Special care must be taken to prevent damage to native plants. Native plants intentionally or unintentionally damaged shall be replaced as needed in the form of container plants during the next growing season in order to attain the performance standards. All nonnative vegetative debris accumulated as a result of weed removal activities shall be legally disposed of off site.

Herbicide Treatment Guidelines. In order to apply an unrestricted herbicide (e.g., Roundup Pro, Rodeo), the Restoration Contractor must have a Pest Control Business License, which requires that at least one individual employed by the Restoration Contractor be in possession of a Qualified Applicator’s License (QAL). If a qualified applicator is not present during treatment, all applicators must have undergone documented herbicide application training. All licenses must be issued by the State of California, be registered in San Bernardino County, and be of current status.

Only Rodeo, an Environmental Protection Agency-approved, glyphosate-based systemic herbicide, may be used. No preemergent herbicides may be used. The following herbicide concentrations shall be used according to the type of application required:

- Foliar spray application: minimum of 3 percent solution
- Foliar wick application: 33 percent solution
- Stump treatment: 100 percent solution

A brightly colored dye shall be used in all applications. The material shall be a nontoxic, water-soluble, liquid material such as “Blazon” by Milliken Chemicals or its equivalent. “Turfmark” is not an acceptable alternative. The dye shall be mixed with the herbicide at no more than one-half the rate specified on the label (one-quarter the rate will usually suffice).

Spraying shall be conducted only when weather conditions are conducive to effective uptake of the herbicide by the targeted species (i.e., sunny, dry, and when plants are actively growing) and when wind conditions are such that herbicide drift is nonexistent (5 mi per hour or less). During herbicide application, protection or avoidance of nontargeted species (i.e., native vegetation) is required. Any nontarget species lost within the restoration area due to intentional or unintentional application of herbicide shall be replaced during the following planting season at the direction of the Monitoring Biologist.

Weed species known to be present on site prior to project initiation include, but are not limited to, the following:

- Giant reed
- Castor bean
- Brazilian pepper
- Wild celery (*Apium graveolens*)
- Australian saltbush (*Atriplex semibacata*)
- Tocalote (*Centaurea melitensis*)
- Shortpod mustard (*Hirschfeldia incana*)
- Myoporum (*Myoporum laetum*)
- Bristly ox-tongue (*Picris echioides*)
- Wild radish (*Raphanus sativus*)
- Curly dock (*Rumex crispus*)
- Russian thistle (*Salsola tragus*)
- New Zealand spinach (*Tetragonia tetragonioides*)
- Spanish bayonet (*Yucca aloifolia*)

Erosion Control

The Restoration Contractor shall be responsible for all postgrading erosion control maintenance required within the restoration area for the entire term of the contract. Erosion control shall include, but not be limited to: (1) continuation of nonvegetative erosion control, as necessary; and (2) repair of

damaged plants, rutting, and washouts. Erosion control products made with a biodegradable mesh such as jute will be used in place of plastic mesh to avoid an entanglement hazard for wildlife.

Pest Control

Insect and herbivore damage control shall be accomplished using only those methods approved by the Monitoring Biologist. No pesticides may be used. This may require fencing or caging all container plants at the earliest sign of damage. In addition, any insect infestation shall be treated as necessary to protect the health and establishment of the plant community, per the recommendation of the Monitoring Biologist.

Temporary Irrigation

The Restoration Contractor shall be responsible for the inspection and maintenance of the irrigation system within the restoration area. The Restoration Contractor shall be responsible for removal of the irrigation system prior to completion of the project.

Litter Removal/Site Maintenance

All trash and other debris shall be removed from the restoration area prior to and during restoration activities. All planted and seeded areas shall be kept neat, clean, and free of nonvegetative debris and trash (including vegetative debris accumulated during weeding activities, which shall be removed as specified).

Pruning and Leaf Litter Removal

The goal of the HMMP is to create a naturally occurring habitat; therefore, no pruning or leaf litter removal shall take place within the restoration area. Therefore, all dead branches shall be left on the shrubs, and all leaf litter shall be left in place and not cleared away from the plantings.

Fertilizer

No fertilizers shall be used in the restoration area during the maintenance period unless directed by the Monitoring Biologist.

PERFORMANCE STANDARDS

The goal of this project is to remove all invasive nonnative species and restore healthy and functional salt marsh habitat. The restoration will be considered successful when all of the following criteria are achieved:

- At least 80 percent relative cover by native salt marsh plant components that are similar in composition to those of adjacent high-quality salt marsh habitat.

- Evidence that the site is sustainable by showing signs of regeneration (progeny and new growth), healthy plants, a low mortality rate, and resistance to weeds (less than 10 percent nonnative weed cover, less than 5 percent cover by nonnative herbaceous invasive weeds, absence of nonnative perennial invasive weeds, and minimal weed maintenance during the previous spring season).
- The site will not be eligible for agency approval until it has gone without irrigation for a period of 2 years.
- Alternatively, the restoration may be considered successful if there is agreement between the Monitoring Biologist and biologists from the California Department of Fish and Game (CDFG), the CCC, and the Corps that the salt marsh restoration area has developed into healthy, functional habitat.

It is the goal of the project to meet all of the above performance standards within 5 years following installation.

SUPERVISION

Monitoring Biologist

The Monitoring Biologist is the Caltrans representative in the field who will be responsible for monitoring the restoration area according to the guidelines set forth in this Plan. The Monitoring Biologist shall be familiar with all aspects of salt marsh restoration. The duties of the Monitoring Biologist will include overseeing all aspects of work performed by the Restoration Contractor. In addition, the Monitoring Biologist will have the responsibility of documenting and reporting the progress of the developing communities to Caltrans, the Corps, CDFG, the USFWS, and the CCC as well as making recommendations for achieving the performance standards. If necessary, the Monitoring Biologist may also prescribe remedial measures.

INSPECTIONS

Pre-installation and post-installation inspections by the Monitoring Biologist shall be requested by the Restoration Contractor to ensure that all work is completed in compliance with these specifications. Inspections will be requested at least 48 hours prior to the time inspection is required. Inspection by the Monitoring Biologist shall be required for each phase of work listed below. In addition, the Monitoring Biologist shall inspect the restoration area more frequently, if necessary, to ensure that the restoration area is continuously in compliance with these specifications. Inspection shall be required for the following phases of work:

- During the removal of nonnative invasive species prior to installation
- During fine grading and topsoil decompaction, if necessary
- Following installation of erosion control, if necessary
- Following installation of the irrigation system, if necessary
- Throughout the grow/kill cycle process
- During the marking of container plant locations

- Following the augering of container plant holes (prior to planting)
- Following container plant installation
- During seeding
- Monthly throughout the first year following installation and quarterly thereafter
- Following removal of the irrigation system, if installed

MONITORING

To ensure that the restoration area is in compliance with these specifications, the restoration area will be evaluated regularly.

The post-installation monitoring program will be as follows:

- Monitoring for survival, appearance, function, wildlife usage, and general compliance will be completed monthly during the first year following installation and quarterly thereafter until the performance standards are met.
- A survey will be conducted in the spring of each year. The native and nonnative species composition, survival, appearance, and function of the plant community will be assessed qualitatively. In addition to the qualitative assessment, quantitative data on native and nonnative vegetation cover and species composition will be collected by performing at least six 25 ft point-intercept transects (measurements taken every 1 ft) within the restoration area. All wildlife species present on site shall be recorded.
- As part of the site inspections and annual surveys, the Monitoring Biologist will prepare field memorandums. The field memorandums will record general ecological observations, make maintenance recommendations, and will include a list of all nonnative species observed on site during the site review. Copies will be sent to Caltrans and the Restoration Contractor.
- If any sensitive species are observed on or in proximity to the restoration area during project surveys, the Monitoring Biologist will submit California Natural Diversity Database (CNDDB) forms and maps within 5 working days of the sightings and will provide the regional CDFG office with copies of the CNDDB forms and survey maps.

The individual who monitors the restoration area shall be an experienced Monitoring Biologist who is qualified to assess the performance of the restoration effort and to recommend corrective measures as needed.

DOCUMENTATION

Approximately 90 days following installation, the Monitoring Biologist will prepare an installation report that describes the installation and how the project was consistent with this HMMP. The installation report will also document the situations where it was necessary to diverge from this HMMP. An annual monitoring report will be prepared each following year until the performance standards are achieved. The as-built and annual monitoring reports will be submitted by the Monitoring Biologist to Caltrans, CDFG, the Corps, the USFWS, and the CCC. The as-built report

will be submitted within 90 days following the completion of installation, and the annual monitoring reports will be submitted prior to June 30 of each year.

The annual monitoring report will include the following:

- A summary of the 120-day establishment period monthly site inspections and monthly site inspections for the first year, and a summary of the quarterly site inspections for each year thereafter
- A description of the existing condition of the restoration area, including descriptions of vegetation composition, weed species, and any erosion problems
- A description of the maintenance activities (including revegetation and weed removal) and when they were conducted
- A summary of the qualitative assessment and the quantitative data collected
- Any observations of wildlife within the restoration area, including sensitive and/or listed species or their sign within the restoration area
- A discussion of any problems encountered during restoration
- Photo documentation at specified locations
- Remedial measures (e.g., weed control, trash removal) that were implemented to correct problems or deficiencies

ADAPTIVE MANAGEMENT

Remedial Measures

The purpose of the remedial measures is to remedy unsuccessful restoration efforts, as indicated by excessive nonnative species, lack of native cover, or erosion. Should the site fail to meet annual performance goals, or if problems are identified during the period between annual evaluations, remedial measures shall be implemented. Remedial measures, as identified in the monitoring report or field memorandums, include weed eradication, replacement of dead or diseased container plantings, and/or reseeding as necessary to meet the performance standards. Such actions will be taken immediately upon identification of problems and will be implemented as often as necessary to meet the performance standards. The removal of dead and/or diseased container plants will be left to the discretion of the Monitoring Biologist. The genetic source of all remedial seed and plants shall be the same as that described in the Restoration Installation section.

APPENDIX A

**PLANT SPECIES CURRENTLY PRESENT WITHIN THE
PROPOSED RESTORATION AREA**

APPENDIX A

PLANT SPECIES CURRENTLY PRESENT WITHIN THE PROPOSED RESTORATION AREA

Species Name	Common Name
<i>Ambrosia psilostachya</i>	western ragweed
* <i>Apium graveolens</i>	wild celery
* <i>Arundo donax</i>	giant reed
<i>Atriplex prostrata</i>	sparscale
* <i>Atriplex semibacata</i>	Australian saltbush
* <i>Centaurea melitensis</i>	toalote
<i>Deinandra fasciculata</i>	fascicled tarweed
<i>Distichlis spicata</i>	salt grass
<i>Encelia californica</i>	California encelia
<i>Frankenia salina</i>	alkali heath
<i>Heliotropium curassavicum</i>	alkali heliotrope
* <i>Hirschfeldia incana</i>	shortpod mustard
<i>Isocoma menziesii</i>	coastal goldenbush
<i>Malvella leprosa</i>	alkali-mallow
* <i>Myoporum laetum</i>	myoporum
* <i>Picris echioides</i>	bristly ox-tongue
<i>Pluchea odorata</i>	marsh fleabane
* <i>Raphanus sativus</i>	wild radish
* <i>Ricinus communis</i>	castor bean
* <i>Rumex crispus</i>	curly dock
<i>Salicornia virginica</i>	common woody pickleweed
* <i>Salsola tragus</i>	Russian thistle
* <i>Schinus terebinthifolius</i>	Brazilian pepper
<i>Scirpus robustus</i>	seacoast bul-rush
* <i>Tetragonia tetragonioides</i>	New Zealand spinach
<i>Typha</i> sp.	cat-tail
<i>Xanthium strumarium</i>	cocklebur
* <i>Yucca aloifolia</i>	Spanish bayonet

* Nonnative species